P394

CONTROLLED DEDIFFERENTIATION OF COSTAL CHONDROCYTES BY BFGF AND THEIR REDIFFERENTIATION BY TGF-BETA

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Purpose: This study evaluated whether costal chondrocytes under the special medium containing bFGF can be considered for articular cartilage repair in the old aged.
Methods: Expansion rate of costal chondrocytes under the special medium containing bFGF was compared with those of costal chondrocytes under the regular chondrocyte growth medium. In addition, phenotype of dedifferentiated chondrocytes after passage 8 was evaluated by cellular morphology and type I and II collagen expression. We also evaluated whether bFGF-stimulated dedifferentiated chondrocytes were redifferentiated either into the adipogenic lineage or chondrogenic lineage under pellet culture with TGF beta, based on histological examination and biochemical analysis.
Results: After passage 8, expansion rate reached over 10,000,000 folds, which showed fully dedifferentiated phenotype. However those bFGF-stimulated dedifferentiated chondrocytes were successfully redifferentiated either into the adipogenic lineage or chondrogenic lineage under pellet culture with TGF beta. Those regenerated hyaline cartilage acquired by controlled dedifferentiation and redifferentiation process expresses GAG, type II collagen, aggrecan, and formed typical lacunae.
Conclusions: We propose that bFGF-stimulated dedifferentiation and subsequent TGF beta-stimulated redifferentiation of costal chondrocytes may be considered for articular cartilage repair in the old aged.